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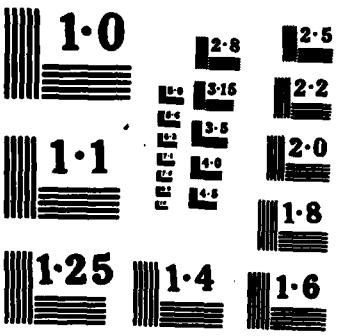
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The investigators are completing the first phase of the algorithm for perceptual segmentation of dot patterns. The results of expert processes that, in parallel, detect interiors, borders and curves have errors due to lack of local evidence for the global role of a dot. Each result is corrected such that (1) it agrees with the results of other experts, and (2) it provides locally smooth borders. The second phase will proceed from the lowest level groupings and build a hierarchy of groupings. The investigators have also started to investigate the use of a "scale-space" representation to separate components of image textural variation due to three-dimensional distance and orientation changes.

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INTERIM REPORT FOR GRANT AFOSR-82-0317, SEPTEMBER 1984

We are completing the first phase of our algorithm for perceptual segmentation of dot patterns. The results of expert processes that, in parallel, detect interiors, borders and curves have errors due to lack of local evidence for the global role of a dot. Each result is corrected such that 1) it agrees with the results of other experts and 2) it provides locally smooth borders. Except for occasional gaps in the borders the union of the corrected results represents a good approximation to the perceptual structure in the dot pattern. Connected component analysis is carried out to identify these gaps. The gaps are filled to close the component contours ensuring local border smoothness.

The second phase will proceed from the lowest level groupings and build a hierarchy of groupings. Processes at higher levels use segments in the lower levels as tokens, and group the tokens based on the geometrical characteristics and configurations of the segments. A single level of the resulting hierarchial segmentation describes the structure of the dot pattern at a given resolution.

We have also started to investigate the use of a "scale-space" representation to seperate components of image textural variation due to three-dimensional distance and orientation changes. The scale-space representation is obtained by applying a laplacian-of-gaussian operator to the image over a continuous range of scales. Mathematical analysis of the scale-space behavior of idealized texture elements leads us to texture measures involving within-level and between-level magnitude comparisons in the scale-space. We are currently developing consistent methods for characterizing scale, so that the additional detail visible within nearby texture elements does not confound comparisons with distant texture samples where A[illegible] detail is visible.

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